



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

[Handwritten signature]

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,166	02/18/2004	Richard W. Foote	P05810	1802
23990	7590	01/17/2006		
DOCKET CLERK P.O. DRAWER 800889 DALLAS, TX 75380			EXAMINER NGUYEN, TUAN H	
			ART UNIT 2813	PAPER NUMBER

DATE MAILED: 01/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/781,166	FOOTE, RICHARD W.	
	Examiner	Art Unit	
	Tuan H. Nguyen	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 11-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 21-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/29/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group II, claims 1-10, 21-25 in the reply filed on 11/3/05 is acknowledged. The traversal is on the ground(s) that "only a "wet etch" process will etch the phosphorus doped oxide layer at one rate and will etch the boron doped oxide layer at a second different rate. A "dry etch" process will etch the two materials at the same rate.". This is not found persuasive because to the contrary to the Applicant's argument, Sadjadi et al. (US 6,495,470) clearly shows the step of etching layer 105 by dry etching process for forming contact opening 106 wherein the etch rate of heavily doped oxide layer 105 is faster than that of the lightly doped oxide layer 103. The etch rate is depended on dopant concentration (see fig. 1e and text on col. 4, second paragraph, and col. 5, second and third paragraphs).

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10, 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Background of the invention in view of Konoshi (US pat. No. 6,168,977) and Tenney et al. (cited ref.).

Background of the invention, fig. 1 and related text on pages 1-3 discloses the conventional method for forming a thin layer of oxide of about 5000 Angstroms over the metal link layer 120 of the laser trimmed fuse with the use of a masked partial etch-back of the passivation layers 130, 140 over the final layer of metal 120.

Background of the invention fails to teach the formation of uniform oxide layer by using a (boron) doped oxide layer having a fast etch rate over a (phosphorus) doped oxide layer having a slow etch rate so that the upper oxide layer could be firmly removed without further etching into the lower oxide layer, preserving the uniform thickness in the lower oxide layer.

Konishi, in a related art as disclosed in figs. 1A-1E and text on col. 3-4, teaches the use of pattern 5b having faster etch rate than that of the insulation layer 4 of doped oxide in the process of etching to form opening 10, since the insulation layer 4 having a uniform thickness for enabling the fuse blow can remain on the fuse patterns 3b, 3c (fig. 1E, col. 4, next to last paragraph), the time required for etching from dividing the thickness by a value of etch rate is inherently calculated in order to stop process from further etching into the lower layer 4.

Tenney et al., in a submitted article entitled: " Etch Rates of Doped Oxides in Solutions of Buffered HF", pages 1091-1095, teaches the relative wet etching characteristics of BSG and PSG in which etch rate of PSG increases much more rapidly with increasing dopant concentration than do those of BSG.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used layers with different etch rates such as boron doped

oxide layer and phosphorus doped oxide layer which have much higher etch rates in wet etching process as suggested by Tenney et al. and Konishi in the conventional process as disclosed in the Background of the invention since it would provide a uniform oxide layer over a metal links layer of a laser trimmed fuse.

With respect to claims 7, 9, 10, the thicknesses of first and second layers, and a further step of etching down to a desired thickness of the layer of boron doped oxide in order to obtain an oxide layer having a thickness of 5000 angstroms over the metal link is considered to involve routine optimization while has been held to be within the level of ordinary skill in the art, as noted In Re Aller 105 USPQ233, 255 (CCPA 1955). Therefore, one of ordinary skill in the requisite art at the time the invention was made would have formed layer with a suitable thickness range in the method for forming oxide layer over the metal link layer in order to optimize the result..

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sadjadi et al., Park, Ying et al., Akram et al., Pong et al. disclose the use of doped oxide layers with different etch rates.

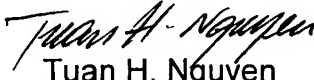
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan H. Nguyen whose telephone number is 571-272-1694. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone

Art Unit: 2813

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Tuan H. Nguyen
Primary Examiner
Art Unit 2813